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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/014,992	12/11/2001	Takeaki Shimanouchi	2500.66054	3379
7590 04/19/2005				
Patrick G. Burns, Esq. GREER, BURNS, CRAIN, LTD. Suite 2500 300 South Wacker Dr. Chicago, IL 60606			EXAMINER TAMAI, KARL I	
			ART UNIT 2834	PAPER NUMBER
DATE MAILED: 04/19/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/014,992

Applicant(s)

SHIMANOUCHI, TAKEAKI

Examiner

Tamai IE Karl

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6, 10-13, 15 and 16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 10, 12, 13, 15 and 16 is/are rejected.
- 7) ☒ Claim(s) 11 is/are objected to:
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the bottom surface of the column formed into a quadrate shape must be shown or the features canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 12 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. The specification does not disclose the bottom surface of the column having the shape of a quadrate. It is unclear how the L shaped electrode and column will be formed or etched to have the bottom of the column for a quadrate.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 16 is rejected over Abe et al. (Abe)(US 6524878) and Horsley (US 6465355). Abe teaches an electrostatic comb actuator having a stator column 5 and electrodes 5a which face the mover 4 mounted over a substrate 12, where the column has a corrosion vestige 10/11 under the bottom of the column 5. Abe does not teach

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the under cut contour being $W/2$. Horsley teaches the amount of the undercut should be minimized as a result effective variable in suspended MEMS devices. It would have been obvious to a person of ordinary skill in the art to construct the actuator of Abe with the corrosion vestige retracting $W/2$ to provide adequate support to the suspended structure while etching the mover from the substrate as taught by Horsley.

6. Claims 1-4, 6, 10, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dyck et al.(Dyck)(US 6393913), Werner (US 6133059),and Park et al. (Park)(US 5747690). Dyck shows and actuator having opposing 26 within a framed moving electrodes 28. Dyck shows the stationary and electrodes are parallel and fixedly mounted on a silicon nitride base plane. Dyck inherently teaches a square column(prism) at the end of the wall which is integrally formed with the wall, which is between the datum planes formed by the outer surfaces of the electrode walls. Dyck teaches every aspect of the invention except the solid insulating piece between the electrodes, the material of the insulating piece is silicon nitride, and the columns being between the walls with a corrosion vestige of $W/2$. Werner teaches an insulating member ZR between the adjacent capacitance electrodes being the same as the insulating base. Werner teaches an electrostatic actuator having stationary electrodes with columns couple to the end of the wall (see FE 12, in figure 6). The corrosion resistant vestige of FE12 is suggested by the drawings as being as least $W/2$, which inherently includes $W/2$. Park teaches electrostatic electrodes with columns being wider and between the walls of the electrodes. It would have been obvious to a person

of ordinary skill in the art at the time of the invention to construct the actuator of Dyck with the insulation between the stationary electrodes to position and provide stability to the electrodes as shown by Werner, and with the insulating material being silicon nitride because Dyck teaches it is the preferred material for the base, and with the column and walls of Park to secure the electrodes to the substrate when surrounded by the moving member.

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dyck et al.(Dyck)(US 6393913), Werner (US 6133059) and Park et al. (Park)(US 5747690).

Dyck, Werner, and Park teach every aspect of the invention except the spacing between the datum planes being three times the wall thickness of the moving electrode. Park suggests the columns are square and more than three times the width of the electrode wall (See figure 4). It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the actuator of Dyck, Werner, and Park with the bottom surface area of the columns being greater $9w^2$ than to optimized performance of the actuator, and because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (see *In re Aller*, 105 USPQ 233).

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dyck et al.(Dyck)(US 6393913), Werner (US 6133059) and Park et al. (Park)(US 5747690).

Dyck, Werner, and Park teach every aspect of the invention except the moving

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electrode having a thickness W and the stable electrode columns have area of $9W^2$ at the basement plane. It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the actuator of Dyck, Werner, and Park with the moving electrode having a thickness W and the stable electrode columns have area of $9W^2$ at the basement plane to optimized the power supply to the electrodes, and because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (see *In re Aller*, 105 USPQ 233).

9. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dyck et al.(Dyck)(US 6393913), Werner (US 6133059) and Park et al. (Park)(US 5747690), in further view of Fujii et al.(Fujii)(US 6227050). Dyck, Werner, and Park teach every aspect of the invention except the insulating film and conductor pieces connecting the column to a wiring pattern. Werner teaches the columns connected to separate wires. Fujii teaches a conductive wiring pattern 122 and an insulating film with the connector piece to the electrodes being surrounded by film (see figure 30). It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the actuator of Dyck, Werner, and Park with the insulating film and conductor pieces connecting the two columns to a wiring pattern of Fujii to utilize know micromachine assembly techniques.

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Allowable Subject Matter

10. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

11. Applicant's arguments with respect to claims 1-~~16~~ have been considered but are vñ moot in view of the new grounds of rejection. Applicant's argument regarding the spacing of the datum planes is not persuasive. The drawings can be used for what they suggest to a person of ordinary skill in the art, where Dyck shows the spacing between the stator electrodes as being greater than the width of the electrodes.

Conclusion

12. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl I.E. Tamai whose telephone number is (571) 272 - 2036.

The examiner can be normally contacted on Monday through Friday from 8:00 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Darren Schuberg, can be reached at (571) 272 - 2044. The facsimile number for the Group is (703) 872 - 9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Karl I Tamai
PRIMARY PATENT EXAMINER
April 13, 2005

KARL TAMAI
PRIMARY EXAMINER

